Astrophysics and Geophysics

ADVANCES IN AUTOMATED ALGORITHMS BASED ON SHAPE FEATURE
EXTRACTION FOR THE CLASSIFICATION OF GALAXIES

Jonathan D. Andreasen
Dr. Shaukat Goderya*

Illinois State University
Department of Physics
Normal, IL 61790-4560
Email: jandreas@phy.ilstu.edu

An accurate automated scheme to classify galaxies is needed in order to efficiently examine data obtained from large sky surveys. By extracting certain shape features from the galaxies obtained from the Zolft Frei Catalog, we hope to relay these characteristic features to an artificial neural network which can detect differences in shape features and use them for classification. To obtain these shape features, we have used an enhancement algorithm to emphasize the arms in the spiral galaxies. After enhancement, the gray-scale images were converted to binary images. Then the images were processed to remove background noise. Finally the shape features were extracted from the galaxies. Our results show that the shape features of Compactness and Bounding Rectangle to perimeter ratio and Compactness and Bounding Polygon to Fill Factor ratio provide clear distinctions between spiral and elliptical galaxies.